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Exercise-I (Conceptual Questions) Build Up Your Understanding

CARBONYL COMPOUNDS

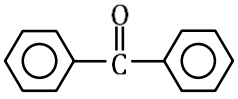
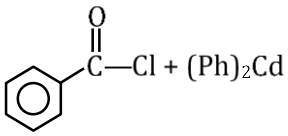
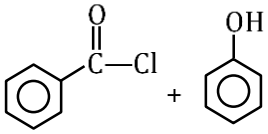
1. Acetaldehyde on warming with Fehling's solution gives a red precipitate of :-
(1) Elemental copper
(2) Cuprous oxide
(3) Cupric oxide
(4) Mixture of all of the above

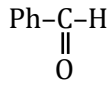
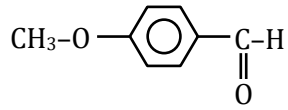
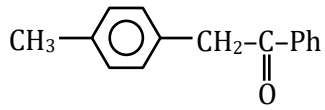
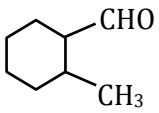
2. Acetone does not form :-
(1) A phenylhydrazone with phenylhydrazine
(2) A sodium bisulphite adduct with sodium bisulphite
(3) A silver mirror with Tollen's reagent
(4) An oxime with hydroxylamine

3. CH_3CHO and CH_3COCH_3 can not be distinguished by :-
(1) Fehling solution (2) Grignard reagent
(3) Schiff's reagent (4) Tollen's reagent

4. Acetone is obtained by the hydrolysis of the addition product of methyl magnesium iodide and:-
(1) HCHO (2) CH_3CHO
(3) CH_3COCH_3 (4) $CH_3-C\equiv N$

5. $Ph-\underset{\underset{Cl}{|}}{\overset{\overset{Cl}{|}}{C}}-CH_3 + \text{aq. KOH} \rightarrow A \xrightarrow[H^{\oplus}]{KCN} B$?
(1) 50% d + 50% ℓ (2) 80% d + 20% ℓ
(3) Meso compound (4) Optically active

6.  can be obtained by :-
(1) 
(2) 
(3) $+ CO + ZnCl_2 + HCN$
(4) None of the above

7. Which does not react with $NaHSO_3$.
(1) 
(2) 
(3) 
(4) 

8. Ketones can be prepared by :-
(1) Rosenmund reduction
(2) Etard reaction
(3) Cannizzaro reaction
(4) Friedel-Craft reaction

9. Carbonyl compounds are best purified by :-
(1) Steam distillation
(2) Hydrolysis of sodium bisulphite adducts
(3) Fractional crytallisation
(4) Sublimation

10. Carbonyl compounds readily undergo :-
(1) Nucleophilic substitutions
(2) Electrophilic addition reactions
(3) Nucleophilic addition reactions
(4) Free radical substitution reactions

11. $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$ and $CH_3-\overset{\overset{O}{\|}}{C}-H$ are readily distinguished by their reaction with :-
(1) Iodine and alkali
(2) 2,4-dinitrophenylhydrazine
(3) Tollen's reagent
(4) All the above

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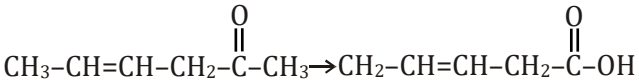
12. Which is the most suitable reagent for the following conversion



(1) $\xrightarrow[(ii)H^{\oplus}]{(i)\text{Tollen's reagent}}$ (2) $\xrightarrow[(ii)H^{\oplus}]{(i)\text{Benzoyl peroxide}}$

(3) $\xrightarrow[(ii)H^{\oplus}]{(i)I_2 \text{ and NaOH}}$ (4) $\xrightarrow{KMnO_4 / H^{\oplus}, \Delta}$

13. Formaldehyde reacts with conc. alkali to form :-

(1) A resinous mass

(2) Formic acid

(3) A mixture of methanol and sodium formate

(4) Methanol

14. Which of the following compounds does not give aldol condensation :-

(1) CH_3CHO (2) CH_3CH_2CHO

(3) HCHO (4) $CH_3CH_2CH_2CHO$

15. Cannizzaro reaction is given by :-

(1) Aldehydes containing α-hydrogen atoms

(2) Aldehydes as well as ketones containing α-hydrogen atoms

(3) Aldehydes not containing α-hydrogen atoms

(4) Aldehydes containing β-hydrogen atoms

16. Which of the following can be converted to $CH_3–CH=CH–CHO$:-

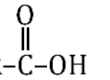
(1) Acetone

(2) Acetaldehyde

(3) Propanaldehyde

(4) Formaldehyde

17. The product of reaction with primary amine and aldehyde is -

(1)  (2) R–ONO

(3) R'–CH=N–R (4) $R–NO_2$

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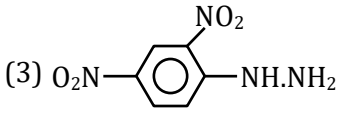
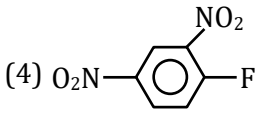
18. Brady's reagent is

(1) $[Cu(NH_3)_4]SO_4$

(2) $KMnO_4/NaIO_4$

(3) 

(4) 

19. A compound with molecular formula C_3H_6O, not gives silver mirror with Tollen's reagent but forms oxime with hydroxyl amine. Compound will be -

(1) $CH_2=CH—CH_2—OH$

(2) CH_3CH_2CHO

(3) $CH_2=CH—O—CH_3$

(4) CH_3COCH_3

20. Aldehyde and ketone are distinguished by reagent

(1) Fehling solution (2) H_2SO_4

(3) $NaHSO_3$ (4) NH_3

21. Carbonyl group is converted into methylene group by -

(1) Acidic reduction

(2) Raney Ni

(3) Basic hydrolysis

(4) Normal Hydrogenation

22. When acetaldol is treated with excess of acid then unsaturated product will be :-

(1) Alcohol (2) Aldehyde

(3) Acid (4) Alkyl halide

23. The reagent used for the separation of acetaldehyde from acetophenone is -

(1) $NaHSO_3$ (2) $C_6H_5NHNH_2$

(3) NH_2OH (4) $NaOH + I_2$

24. The most suitable reagent for the conversion of $RCH_2OH \longrightarrow RCHO$

(1) $KMnO_4$

(2) $K_2Cr_2O_7$

(3) CrO_3/H_2SO_4

(4) PCC (Pyridinium chloro chromate)

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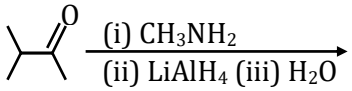
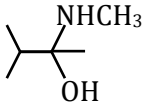
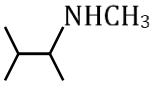
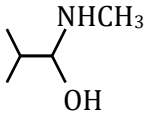
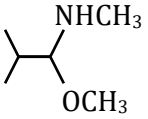
25. The major organic product formed from the following reaction is :–

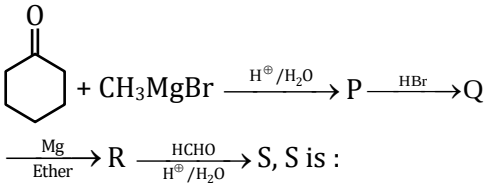


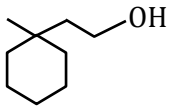
(1) 

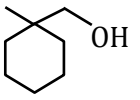
(2) 

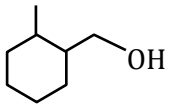
(3) 

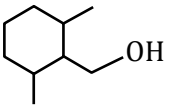
(4) 

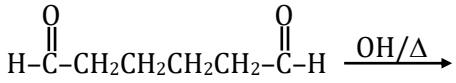
26. 

(1) 

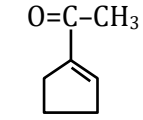
(2) 

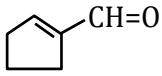
(3) 

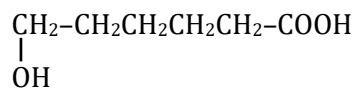
(4) 

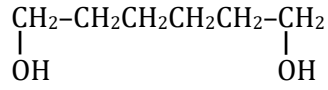
27. 

Product (A) is :-

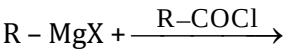
(1) 

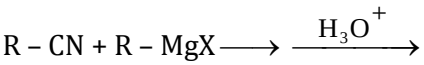
(2) 

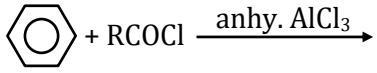
(3) 

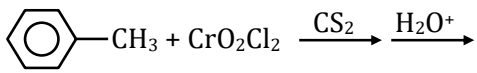
(4) 

28. Which of the following reaction will not give ketone?

(1) 

(2) 

(3) 

(4) 

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29. Select the incorrect option :

Conversion	**Reagent**
(1) Hexan-1-ol ⟶ hexanal	$C_5H_5NH^+CrO_3Cl^-$
(2) Ethanenitrile ⟶ Ethanal	DIBAL–H
(3) p-fluorotoluene, ⟶ p-fluorobenzaldehyde	$K_2Cr_2O_7$, H^+
(4) But-2-ene ⟶ Ethanal	O_3, H_2O-Zn dust

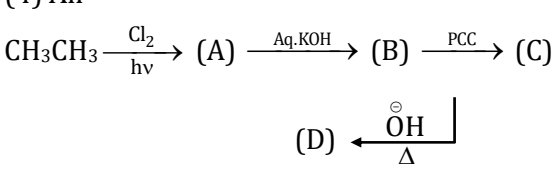
30. True statement about acetone is

(1) α–H of acetone is acidic due to strong electron withdrawing carbonyl group

(2) α–H of acetone is acidic due to resonance stabilisation of conjugate base

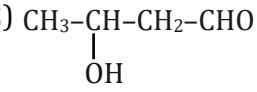
(3) It gives β-Hydroxy ketone with dilute alkali

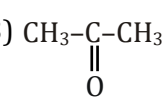
(4) All

31. 

The product D is :-

(1) $CH_2 = CH_2$

(2) 

(3) 

(4) $CH_3–CH=CH–CHO$

32. Select the correct statement for C=O and C=C bond.

(1) Carbon–Oxygen double bond is polar but carbon-carbon double bond is non-polar

(2) Carbon–Oxygen bond length is 123 pm than that of carbon-carbon bond length is 134 pm

(3) Carbonyl compounds undergo nucleophilic addition reaction but compounds containing ethylenic double bonds undergo electrophilic addition reaction

(4) All of these

33. Select the structure of chromium complex formed by the reaction of toluene with chromylchloride followed by hydrolysis to give benzaldehyde and also the name of the reaction.

(1) $CH(OCrCl_2)_2$ and Etard reaction

(2) $CH(OCrOHCl_2)_2$ and Etard reaction

(3) $CH_2(OCrOHCl_2)$ and Rosenmund reaction

(4) $CH(OCrOH_2Cl)_2$ and Rosenmund reaction

34. The methanal, ethanal and propanone are miscible with water because they form

(1) Vander waal's forces with water

(2) H-bond with water

(3) Dipole-dipole bond with water

(4) Ion-dipole bond with water

35. The correct increasing order of carbonyl compounds towards nucleophilic addition reaction.

(1) Butanone < Propanone < Propanal < Ethanal

(2) Butanone < Propanal < Propanone < Ethanal

(3) Butanone < Ethanal < Propanone < Propanal

(4) Butanone < Ethanal < Propanal < Propanone

36. Which of the following carbonyl group give the positive fehling test ?

(1) Aliphatic aldehydes

(2) Aromatic aldehydes

(3) Ketones

(4) Both (1) and (2)

CARBOXYLIC ACID

37. When propanoic acid is treated with aqueous sodium bicarbonate, CO_2 is liberated. The C of CO_2 comes from :-

(1) Methyl group

(2) Carboxylic acid group

(3) Methylene group

(4) Bicarbonate

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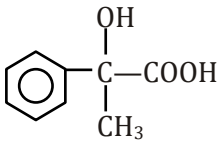
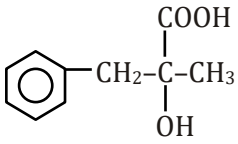
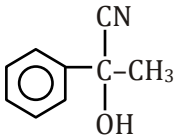
38. In a set of reactions acetic acid yielded a product D

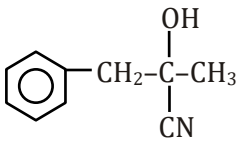
$$CH_3COOH \xrightarrow{SOCl_2} A \xrightarrow[Anhy.AlCl_3]{Benzene} B \xrightarrow{NaCl} C \xrightarrow{H_3O^{\oplus}} D$$

The structure of D would be –

(1) 

(2) 

(3) 

(4) 

ACID DERIVATIVE

39. The compounds A and B in the reaction sequence

$$B \xleftarrow{Phenol} CH_3COCl \xrightarrow{CH_3COONa} A$$

are given by the set respectively :-

(1) $CH_3CO-O-COCH_3$, $C_6H_5CH_2OH$

(2) $CH_3CO-O-COCH_3$, $C_6H_5OCOCH_3$

(3) CH_3COCH_3, $C_6H_5OCOCH_3$

(4) $CH_3-\overset{\overset{O}{\|}}{C}-O-O-\overset{\overset{O}{\|}}{C}-CH_3$, $CH_3-\overset{\overset{O}{\|}}{C}-O-C_6H_5$

40. $CH_3-CH_2-COOH \xrightarrow{Red\ P/Cl_2} A \xrightarrow[KOH]{Alc.} B$

structure of B is :-

(1) $CH_2=CH-COOH$

(2) $CH_3-\underset{\underset{Cl}{|}}{CH}-COOH$

(3) $\underset{\underset{Cl}{|}}{CH_2}-CH_2-COOH$

(4) $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-Cl$

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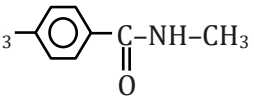
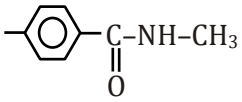
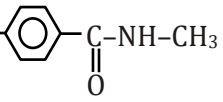
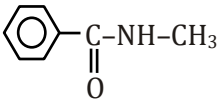
41. Which is most reactive towards hydrolysis.

(1) 

(2) 

(3) 

(4) 

42. Which of the following reagents may be used to distinguish between phenol and benzoic acid ?

(1) Victor-Mayer test (2) Neutral $FeCl_3$

(3) Aqueous NaOH (4) Tollen's reagent

43. Acyl chlorides undergo :-

(1) Nucleophilic addition reactions

(2) Nucleophilic substitution reactions

(3) Electrophilic substitution reactions

(4) Electrophilic addition reactions

44. The reaction of ethanol on acetic anhydride is an example of :-

(1) Nucleophilic addition

(2) Nucleophilic substitution

(3) Electrophilic addition

(4) Free radical substitution

45. The reduction of acetamide gives :-

(1) $CH_3CH_2NH_2$ (2) $(CH_3)_2CHNH_2$

(3) $(CH_3)_3CNH_2$ (4) $(CH_3CH_2)_2NH$

46. Which is used in preparation of aldehyde by rosenmund reduction

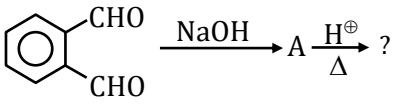
(1) Ester (2) Acid

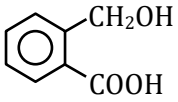
(3) Acid halide (4) Alcohol

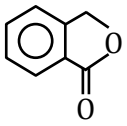
47. $CH_3-\underset{\underset{O}{\|}}{C}-NH_2 \xrightarrow[\Delta]{P_2O_5} ?$

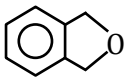
(1) CH_3COOH (2) CH_3-CN

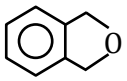
(3) CH_3-CH_3 (4) CH_3-CHO

48. 

(1) 

(2) 

(3) 

(4) 

EXERCISE-I (Conceptual Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	2	3	2	4	1	1	3	4	2	3	3	3	3	3	3
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	2	3	3	4	1	1	2	1	4	2	2	2	4	3	4
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	4	4	2	2	1	1	4	1	2	1	2	2	2	2	1
Question	46	47	48												
Answer	3	2	2												

TG: @Chalnaayaaar

Exercise-II (Previous Year Questions) AIPMT/NEET

AIPMT 2006

1. Nucleophilic addition reaction will be most favoured in :

(1) $CH_3CH_2CH_2-\overset{\overset{O}{\|}}{C}-CH_3$

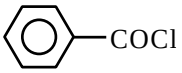
(2) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$

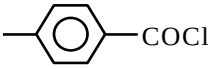
(3) $CH_3-CH_2-CH_2-\overset{\overset{O}{\|}}{C}-H$

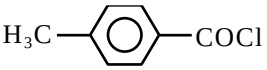
(4) $CH_3-\overset{\overset{O}{\|}}{C}-H$

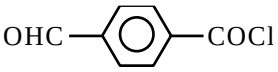
AIPMT 2007

2. Consider the following compounds:

(i) 

(ii) 

(iii) 

(iv) 

The correct order of reactivity towards hydrolysis is:-

(1) (i) > (ii) > (iii) > (iv)

(2) (iv) > (ii) > (i) > (iii)

(3) (ii) > (iv) > (i) > (iii)

(4) (ii) > (iv) > (iii) > (i)

3. Which one of the following on treatment with 50% aq. NaOH yields the corresponding alcohol and acid

(1) C_6H_5CHO (2) $CH_3CH_2CH_2CHO$

(3) CH_3COCH_3 (4) CH_3CHO

4. The product formed in aldol reaction is :-

(1) A β–hydroxy aldehyde or ketone

(2) An α–hydroxy aldehyde or ketone

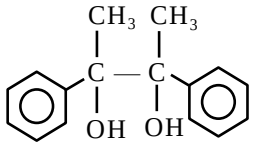
(3) An α, β–unsaturated ester

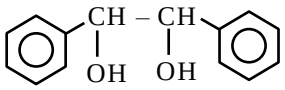
(4) A β–hydroxy acid

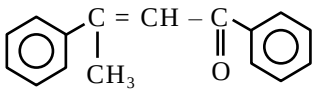
TG: @Chalnaayaaar

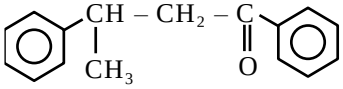
AIPMT 2008

5. Acetophenone when reacted with a base, C_2H_5ONa, yields a stable compound which has the structure :-

(1) 

(2) 

(3) 

(4) 

6. A strong base can abstract an α- hydrogen from

(1) Ketone (2) Alkane

(3) Alkene (4) Amine

7. The relative reactivities of acyl compounds towards nucleophillic substitution are in the order of :-

(1) Acid anhydride>Amide > Ester >Acyl chloride

(2) Acyl chloride >Ester>Acid anhydride > Amide

(3) Acyl chloride >Acid anhydride >Ester> Amide

(4) Ester >Acyl chloride>Amide >Acid anhydride

AIPMT 2009

8. Propionic acid with Br_2/P yields a dibromo product. Its structure would be :-

(1) $CH_3-\overset{\overset{Br}{|}}{\underset{\underset{Br}{|}}{C}}-COOH$

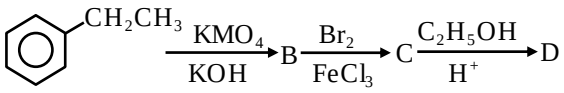
(2) $CH_2Br - CHBr - COOH$

(3) $H-\overset{\overset{Br}{|}}{\underset{\underset{Br}{|}}{C}}-CH_2COOH$

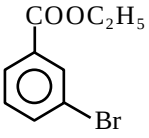
(4) $CH_2Br - CH_2 - COBr$

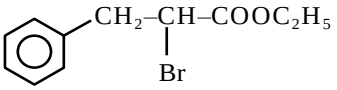
TG: @Chalnaayaaar

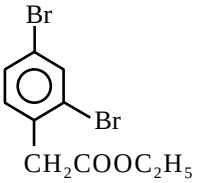
9. In a set of reactions, ethyl benzene yielded a product D

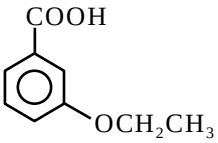


'D' would be :-

(1) 

(2) 

(3) 

(4) 

AIPMT 2010

10. Which of the following reactions will not result in the formation of carbon-carbon bonds ?

(1) Friedel-Crafts acylation

(2) Reimer-Tieman reaction

(3) Cannizaro reaction

(4) Wurtz reaction

11. Clemmensen reduction of a ketone is carried out in the presence of which of the following?

(1) Glycol with KOH

(2) Zn-Hg with HCl

(3) $LiAlH_4$

(4) H_2 and Pt as catalyst

12. Among the given compounds, the most susceptible to nucleophilic attack at the carbonyl group is :-

(1) CH_3COCl

(2) CH_3COOCH_3

(3) CH_3CONH_2

(4) $CH_3COOCOCH_3$

TG: @Chalnaayaaar

AIPMT Mains 2011

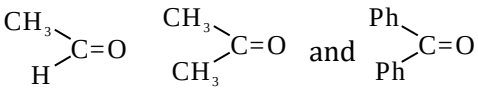
13. Match the compounds given in List-I with List-II and select the suitable option using the code given below.

List-I	List-II
(a) Benzaldehyde	(i) Phenolphthalein
(b) Phthalic anhydride	(ii) Benzoin condensation
(c) Phenyl benzoate	(iii) Oil of wintergreen
(d) Methyl salicylate	(iv) Fries rearrangement

Code :

	(a)	(b)	(c)	(d)
(1)	(ii)	(i)	(iv)	(iii)
(2)	(iv)	(i)	(iii)	(ii)
(3)	(iv)	(ii)	(iii)	(i)
(4)	(ii)	(iii)	(iv)	(i)

14. The order of reactivity of phenyl magnesium bromide (PhMgBr) with the following compounds :-



(I) (II) (III)

(1) I > II > III

(2) III > II > I

(3) II > I > III

(4) I > III > II

AIPMT Pre. 2012

15. In the following sequence of reactions

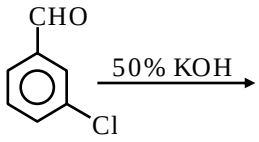
$CH_3 - Br \xrightarrow{KCN} A \xrightarrow{H_3O^+} B \xrightarrow[ether]{LiAlH_4} C,$

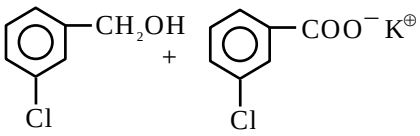
the end product (C) is:

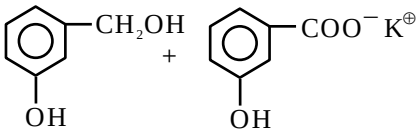
(1) Acetaldehyde (2) Ethyl alcohol

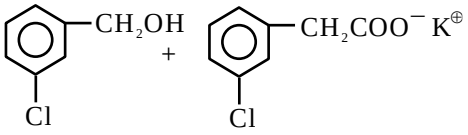
(3) Acetone (4) Methane

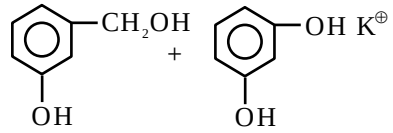
16. Predict the products in the given reaction.



(1) 

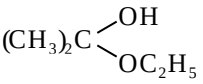
(2) 

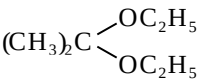
(3) 

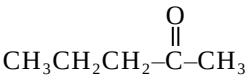
(4) 

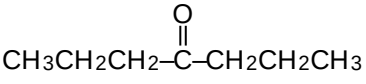
17. CH_3CHO and $C_6H_5CH_2CHO$ can be distinguished chemically by :
(1) Tollen's reagent test
(2) Fehling solution test
(3) Benedict test
(4) Iodoform test

18. Acetone is treated with excess of ethanol in the presence of hydrochloric acid. The product obtained is:

(1) 

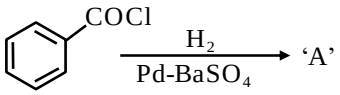
(2) 

(3) 

(4) 

AIPMT Mains 2012

19. Consider the following reaction :

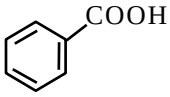


The product 'A' is :
(1) $C_6H_5COCH_3$ (2) C_6H_5Cl
(3) C_6H_5CHO (4) C_6H_5OH

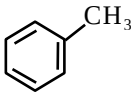
TG: @Chalnaayaaar

NEET UG 2013

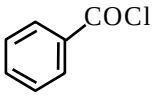
20. Reaction by which Benzaldehyde cannot be prepared :-

(1) 

+ Zn/Hg and conc. HCl

(2) 

+ CrO_2Cl_2 in CS_2 followed by $H_3O^{\oplus}$

(3) 

+ H_2 in presence of $Pd+BaSO_4$

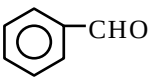
(4)
+ CO+HCl in presence of anhydrous $AlCl_3$

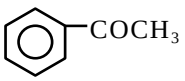
AIPMT 2014

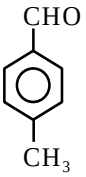
21. Among the following sets of reactants which one produces anisole?
(1) CH_3CHO ; RMgX
(2) C_6H_5OH ; NaOH ; CH_3I
(3) C_6H_5OH ; neutral $FeCl_3$
(4) $C_6H_5 - CH_3$; CH_3COCl; $AlCl_3$

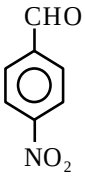
22. Which of the following will not be soluble in sodium hydrogen carbonate?
(1) 2, 4, 6-trinitrophenol
(2) Benzoic acid
(3) o-Nitrophenol
(4) Benzenesulphonic acid

23. Which one is most reactive towards Nucleophilic addition reaction?

(1) 

(2) 

(3) 

(4) 

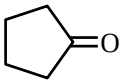
TG: @Chalnaayaaar

AIPMT 2015

24. An organic compound 'X' having molecular formula $C_5H_{10}O$ yields phenyl hydrazone and gives negative response to the Iodoform test and Tollen's test. It produces n-pentane on reduction. 'X' could be :-

(1) 2-pentanone (2) 3-pentanone

(3) n-amyl alcohol (4) pentanal

25. Treatment of cyclopentanone  with methyl lithium gives which of the following species ?

(1) Cyclopentanonyl cation

(2) Cyclopentanonyl radical

(3) Cyclopentanonyl biradical

(4) Cyclopentanonyl anion

RE-AIPMT 2015

26. Reaction of carbonyl compound with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is :

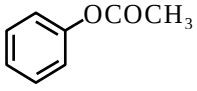
(1) Hydrocyanic acid

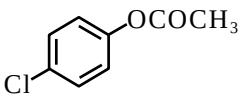
(2) Sodium hydrogen sulphite

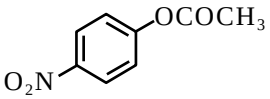
(3) A Grignard reagent

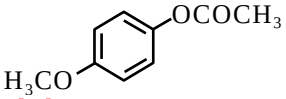
(4) Hydrazine in presence of feebly acidic solution

27. Which one of the following esters gets hydrolysed most easily under alkaline conditions?

(1) 

(2) 

(3) 

(4) 

TG: @Chalnaayaaar

NEET-I 2016

28. Which of the following reagents would distinguish cis-cyclopentane-1,2-diol from its trans-isomer?

(1) Acetone

(2) Ozone

(3) MnO_2

(4) Aluminium isopropoxide

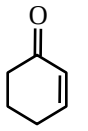
29. The product formed by the reaction of an aldehyde with a primary amine is :-

(1) Schiff base (2) Ketone

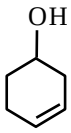
(3) Carboxylic acid (4) Aromatic acid

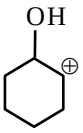
NEET-II 2016

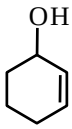
30. The **correct** structure of the product A formed in the reaction

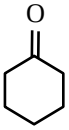


is :-

(1) 

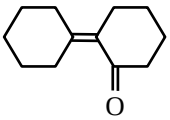
(2) 

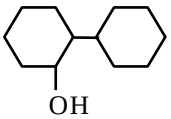
(3) 

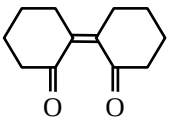
(4) 

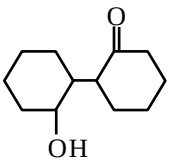
NEET(UG) 2017

31. Of the following, which is the product formed when cyclohexanone undergoes aldol condensation followed by heating ?

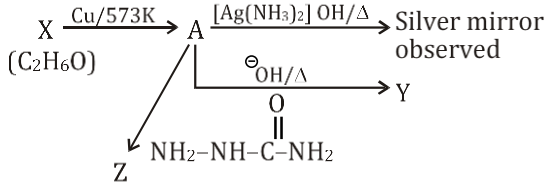
(1) 

(2) 

(3) 

(4) 

32. Consider the reactions :-



Identify A, X, Y and Z

(1) A-Methoxymethane, X-Ethanol, Y-Ethanoic acid, Z-Semicarbsazide.

(2) A-Ethanal, X-Ethanol, Y-But-2-enal, Z-Semicarbazone

(3) A-Ethanol, X-Acetaldehyde, Y-Butanone, Z-Hydrazone

(4) A-Methoxymethane, X-Ethanoic acid, Y-Acetate ion, Z-hydrazine

NEET(UG) 2018

33. Carboxylic acid have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass. It is due to their

(1) Formation of intramolecular H-bonding

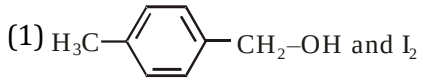
(2) Formation of carboxylate ion

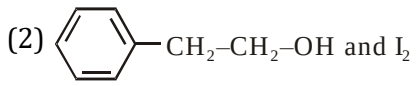
(3) More extensive association of carboxylic acid via van der Waals force of attraction

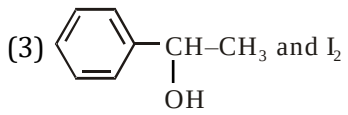
(4) Formation of intermolecular H-bonding.

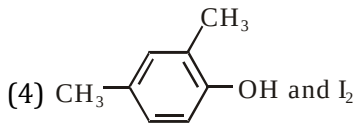
34. Compound A, $C_8H_{10}O$, is found to react with NaOI (produced by reacting Y with NaOH) and yields a yellow precipitate with characteristic smell.

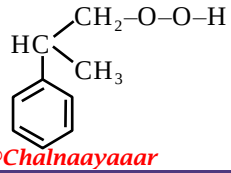
A and Y are respectively

(1) 

(2) 

(3) 

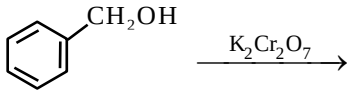
(4) 

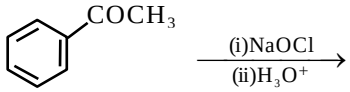


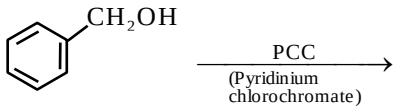
TG: @Chalnaayaaar

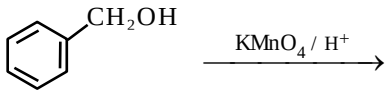
NEET(UG) 2019 (ODISHA)

35. The reaction that does not give benzoic acid as the major product is :-

(1) 

(2) 

(3) 

(4) 

36. When vapours of a secondary alcohol is passed over heated copper at 573 K, the product formed is :-

(1) A carboxylic acid (2) An aldehyde

(3) A ketone (4) An alkene

NEET(UG) 2020

37. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as :

(1) Cross Aldol condensation

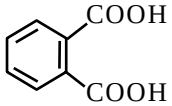
(2) Aldol condensation

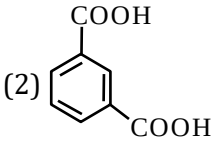
(3) Cannizzaro's reaction

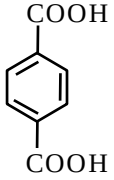
(4) Cross Cannizzaro's reaction

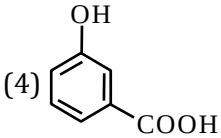
NEET(UG) 2020 (COVID-19)

38. Which of the following acid will form an (a) Anhydride on heating and (b) Acid imide on strong heating with ammonia ?

(1) 

(2) 

(3) 

(4) 

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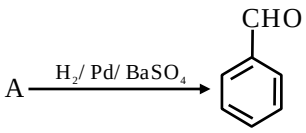
39. Identify compound (A) in the following reaction :

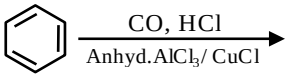


(1) Benzoyl chloride (2) Toluene
(3) Acetophenone (4) Benzoic acid

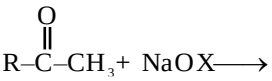
NEET(UG) 2021

40. Match **List-I** with **List-II**.

List-I **List-II**

(a) 

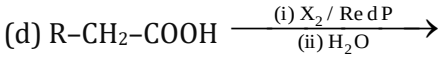
(i) Hell-Volhard-Zelilnsky reaction

(b) 

(ii) Gattermann-Koch Reaction

(c)

(iii) Haloform reaction

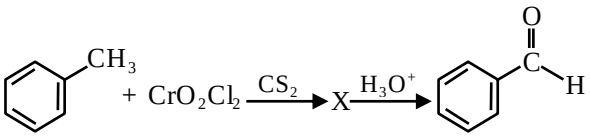
(d) 

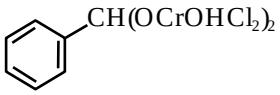
(iv) Esterification

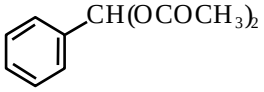
Choose the **correct** answer from the options given below.

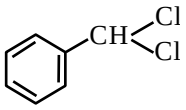
(1) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)
(2) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)
(3) (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)
(4) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

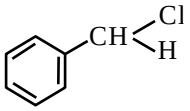
41. The intermediate compound 'X' in the following chemical reaction is :



(1) 

(2) 

(3) 

(4) 

EXERCISE-II (Previous Year Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	4	3	1	1	3	1	3	1	1	3	2	1	1	1	2
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	1	4	2	3	1	2	3	4	2	4	4	3	1	1	4
Question	31	32	33	34	35	36	37	38	39	40	41				
Answer	1	2	4	3	3	3	1	1	1	4	1				

TG: @Chalnaayaaar

Exercise-III (Analytical Questions) Master Your Understanding

1. Which of the following aldehydes does not form iodoform on heating with iodine and alkali :-

(1) $CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{O}{\|}}{C}-H$ (2) ICH_2CHO

(3) CH_3-CH_2-CHO (4) $CH_3-\underset{\underset{OH}{|}}{CH}-\overset{\overset{O}{\|}}{C}-H$

2. A carbonyl compound gives a positive iodoform test but does not reduce Tollen's reagent or Fehling's solution. It forms a cyanohydrin with HCN, which on hydrolysis gives a hydroxy acid with a methyl side chain. The compound is :-

(1) Acetaldehyde (2) Propionaldehyde

(3) Acetone (4) Crotonaldehyde

3. Which of the following statement is wrong :-

(1) All methyl ketones give a positive iodoform test

(2) Acetaldehyde is the only aldehyde that gives iodoform test

(3) All secondary alcohols give positive iodoform test

(4) Any alcohol that can be oxidised to an acetyl group gives a positive iodoform test

4. The compounds A, B and C in the reaction sequence

$$\begin{matrix}CH_3\\CH_3\end{matrix}\!\!>\!C=O \xrightarrow[\text{Alkali}]{I_2} A \xrightarrow[\Delta]{Ag} B \xrightarrow[Hg^{+2}]{\text{dil. } H_2SO_4} C$$

are given by the set :-

(1) CHI_3, $H_2C=CH_2$, CH_3CH_2-OH

(2) CHI_3, $HC\equiv CH$, CH_3CHO

(3) CHI_3, $CH_3-C\equiv CH$, CH_3COCH_3

(4) CHI_3, $CH_3-\underset{\underset{OH}{|}}{CH}-CH_3$, $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$

5. In the reaction sequence

$$RCOCl + H_2 \xrightarrow{Pd+BaSO_4} A \xrightarrow{HCN} B \xrightarrow{H_3O^{\oplus}} C$$

A, B and C are given by the set :-

(1) RCHO, RCH(OH)CN, $RCH(OH)CH_2NH_2$

(2) RCHO, RCH(OH)CN, RCH(OH)COOH

(3) RCHO, $R-\underset{\underset{O}{\|}}{C}-\underset{\underset{CN}{|}}{CH_2}$, $R-\underset{\underset{O}{\|}}{C}-CH_2-\underset{\underset{O}{\|}}{C}-OH$

(4) RCHO, $R-CH_2-CN$, $R-CH_2-COOH$

6. In the reaction sequence

$$CH_3-C\equiv CH \xrightarrow{\text{dil } H_2SO_4, Hg^{\oplus 2}} A \xrightarrow{CHCl_3} B$$
$$A \xrightarrow[NaOH]{I_2} C$$

A, B and C are given by the set :-

(1) CH_3CH_2CHO, $CH_3CH_2CH_2Cl$, CHI_3

(2) CH_3COCH_3, $CCl_3-\underset{\underset{O}{\|}}{C}-CH_3$, CHI_3

(3) CH_3COCH_3, $CCl_3-\underset{\underset{O}{\|}}{C}(CH_3)_2$, CHI_3

(4) CH_3CH_2CHO, $CCl_3-\underset{\underset{O}{\|}}{C}-CH_2-CH_3$, CHI_3

7. The reagents A and B in the reaction sequence

$$CH_3COOC_2H_5 \xrightarrow{A} CH_3COOC(CH_3)_3$$
$$\downarrow B$$
$$CH_3CONHNH_2$$

are given by the set :-

(1) $CH_3-\underset{\underset{CH_3}{|}}{CH}-OH$, H_2N-NH_2

(2) $CH_3-\underset{\underset{CH_3}{|}}{CH}-OH$, H_2N-OH

(3) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-OH$, H_2N-NH_2

(4) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-OH$, H_2N-OH

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TG: @Chalnaayaaar

8. Methyl amine reacts with acetyl chloride and forms :-

(1) CH_3NH_2 (2) CH_3NHNa

(3) $CH_3NHCOCH_3$ (4) $(CH_3)_2NCOCH_3$

9. $CH_3CH_2Cl \xrightarrow{NaCN} X \xrightarrow{Ni/\ H_2} Y \xrightarrow[\text{anhydride}]{\text{Acetic}} Z$

Z in the above reaction sequence is :–

(1) $CH_3CH_2CH_2NHCOCH_3$

(2) $CH_3CH_2CH_2NH_2$

(3) $CH_3CH_2CH_2CONHCH_3$

(4) $CH_3CH_2CH_2CONHCOCH_3$

10. In a set of the given reactions, acetic acid yielded a product C.

$CH_3COOH \xrightarrow{PCl_5} A \xrightarrow[AlCl_3]{C_6H_6} B \xrightarrow[\text{ether}]{C_2H_5MgBr/\ H_3O^{\oplus}}$ C product C would be:-

(1) $CH_3CH(OH)C_2H_5$ (2) $CH_3COC_6H_5$

(3) $CH_3CH(OH)C_6H_5$ (4) $CH_3-\underset{\displaystyle C_2H_5}{\underset{|}{C}}(OH)C_6H_5$

11. CH_3CHO and CH_3COCH_3 can not be distinguished by :-

(1) Fehling solution (2) Grignard reagent

(3) Schiff's reagent (4) Tollen's reagent

12. $CH_3CH_2CH_2-C\equiv N \xrightarrow{H_3O^{\oplus}} A \xrightarrow[\Delta]{NH_3} B$

Product 'B' is :-

(1) $CH_3-CH_2CH_2-\underset{\displaystyle O}{\underset{\|}{C}}-OH$

(2) $CH_3CH_2CH_2-\underset{\displaystyle O}{\underset{\|}{C}}-H$

(3) $CH_3CH_2CH_2-NC$

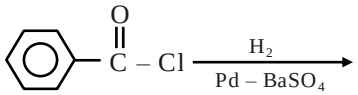
(4) $CH_3CH_2CH_2-\underset{\displaystyle O}{\underset{\|}{C}}-NH_2$

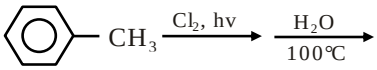
13. Sodium ethoxide has reacted with ethanoyl chloride. The compound that is produced in the above reaction is :-

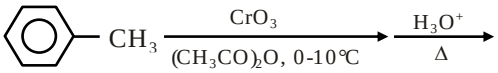
(1) Ethyl chloride (2) Ethyl ethanoate

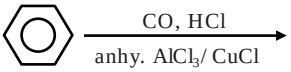
(3) Diethyl ether (4) 2–Butanone

14. Which of the following can be used to prepare benzaldehyde ?

(I) 

(II) 

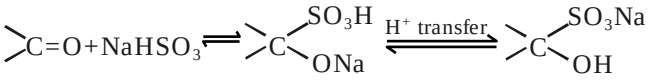
(III) 

(IV) 

(1) I, II (2) II, III, IV

(3) I, III, IV (4) I, II, III, IV

15. Select the correct option for the following reaction:



(1) The position of equilibrium is on RHS for most ketones

(2) The position of equilibrium is on LHS for most aldehydes

(3) The hydrogen sulphite addition compound is water insoluble

(4) Sulphite addition compounds are useful for separation and purification of aldehydes

16. Select the correct option about Fehling's test:

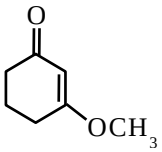
(1) Fehling test is given by all aldehydes but not by ketones

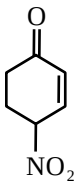
(2) A red brown ppt. of CuO confirms the test

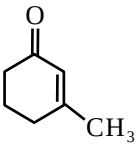
(3) Fehling solution 'A' is aq. $CuSO_4$

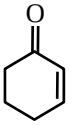
(4) Fehling solution 'B' is alkaline sodium potassium citrate

17. Correct reactivity order towards nucleophilic addition is

(a) 

(b) 

(c) 

(d) 

(1) b > a > d > c (2) a > b > d > c

(3) b > d > c > a (4) b > d > a > c

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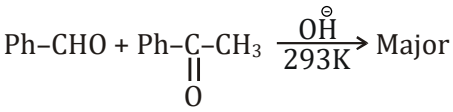
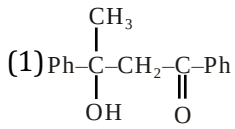
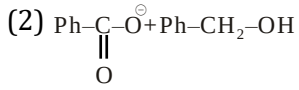
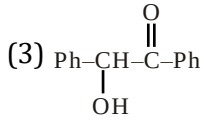
18. For the reaction :-

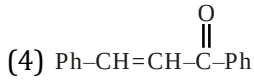


The major product is :

(1) 

(2) 

(3) 

(4) 

19. Which of the following substrates gives same product on the reduction with DIBAL-H ?

(1) $CH_3-(CH_2)_4-CN$ and $CH_3-(CH_2)_5-COOH$

(2) $CH_3-(CH_2)_4-CN$ and $CH_3-(CH_2)_4-COOC_2H_5$

(3) $CH_3-(CH_2)_4-COOH$ and $CH_3-(CH_2)_4-COCH_3$

(4) $CH_3-(CH_2)_5-COOH$ and $CH_3(CH_2)_4-COOC_2H_5$

20. Choose the correct alternative from the following.

(1) Ketones are more reactive than aldehydes towards NAR.

(2) Aldehydes are more reactive than ketones towards NAR.

(3) Formaldehyde is the least reactive carbonyl Compound towards NAR

(4) Steric hindrance does not play a role to effect the reactivity of carbonyl compounds towards NAR.

21. Which of the following reagents is/are used in the given reaction ?

$RCHO \longrightarrow RCOOH$

(1) $KMnO_4/H^+$

(2) Potassium dichromate

(3) Tollen's reagent

(4) All of the above

22. Which of the following statements is/are correct?

(1) Aldehydes are generally oxidised under vigorous conditions

(2) Ketones are easily oxidised to carboxylic acids even under mild oxidising agents

(3) Oxidation of ketones involves carbon-carbon bond cleavage to give a mixture of carboxylic acids having lesser number of c-atoms than the parent ketones.

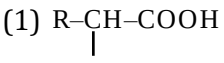
(4) All of the above

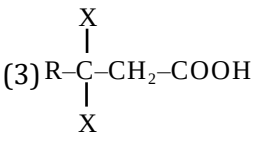
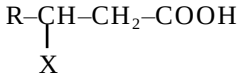
23. Which type of reaction(s) is/are involved in the cannizzaro reaction ?

(1) Reduction (2) Oxidation

(3) Both (1) and (2) (4) None of these

24. The product formed during Hell-volhard-Zelinsky reaction is :-

(1)  (2) $R-CH_2-COX$

(3)  (4) 

25. Cyanohydrin of the following compound on hydrolysis gives compound that can show optical isomerism :

(1) HCHO (2) CH_3CHO

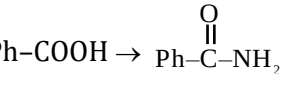
(3) CH_3COCH_3 (4) All the above

26. When acetone reacts with Grignard reagent followed by hydrolysis, it gives :

(1) 1° –alcohol (2) 2° –alcohol

(3) 3° –alcohol (4) Methyl alcohol

27. Match the column

	Column-I (Transformations)		**Column-II (Reagents)**
(a)	$R-COOH \rightarrow R-CH_2OH$	(p)	NH_3/Δ
(b)		(q)	Cl_2/Red P, H_2O
(c)	$R-CH_2COOH \rightarrow$	(r)	P_2O_5, Δ
(d)	$CH_3COOH \rightarrow (CH_3CO)_2O$	(s)	$B_2H_6/H_3O^{\oplus}$

(1) a = p, b = s, c = r, d = q

(2) a = r, b = p, c = s, d = q

(3) a = s, b = q, c = r, d = p

(4) a = s, b = p, c = q, d = r

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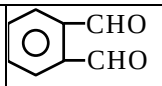
28. Match the column

Column-I (Transformations)		Column-II (Reagents)	
(a)	Allyl alcohol to propenal	(p)	$K_2Cr_2O_7/H^{\oplus}$
(b)	Ethane nitrile to ethanal	(q)	O_3/H_2O-Zn dust
(c)	1-hexanol to hexanoic acid	(r)	PCC
(d)	2-Butene to ethanal	(s)	DIBAL-H

(1) a=p, b=s, c=r, d=q (2) a=r, b=p, c=s, d=q
(3) a=r, b=s, c=p, d=q (4) a=s, b=p, c=q, d=r

29. Match the column

Column-I (Compounds)		Column-II (Common Name)	
(a)		(p)	Isobutyraldehyde
(b)	$(CH_3)_2C=CHCOCH_3$	(q)	Acrolein
(c)	$(CH_3)_2CHCHO$	(r)	Mesityl oxide
(d)	$CH_2=CH-CHO$	(s)	o-Phthalaldehyde

(1) a=r, b=p, c=q, d=s (2) a=s, b=r, c=p, d=q
(3) a=r, b=s, c=p, d=q (4) a=s, b=p, c=q, d=r

30. Match the column

Column-I (Aldol Reaction)		Column-II (Products)	
(a)	$2CH_3CHO \xrightarrow{dil.NaOH}$	(p)	$CH_3C(OH)CH_3.CH_2COCH_3$
(b)	$2CH_3COCH_3 \xrightarrow{dil.NaOH}$	(q)	$CH_3CH(OH)CH_2CHO$
(c)	$2HCHO \xrightarrow{Conc.NaOH}$	(r)	$C_6H_5CH_2OH+HCOONa$
(d)	$C_6H_5CHO+HCHO \xrightarrow{Conc.NaOH}$	(s)	$CH_3OH + HCOONa$

(1) a=r, b=s, c=q, d=p
(2) a=q, b=p, c=s, d=r
(3) a=q, b=s, c=r, d=p
(4) a=r, b=p, c=s, d=p

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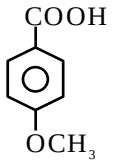
31. Match the column

Column-I (Compound)		Column-II (pKa)	
(a)	Benzoic acid	(p)	4.76
(b)	Acetic acid	(q)	0.23
(c)		(r)	4.19
(d)	Trifluoro acetic acid	(s)	4.46

(1) a = s, b = p, c = q, d = r
(2) a = s, b = q, c = r, d = q
(3) a = r, b = p, c = s, d = q
(4) a = r, b = q, c = p, d = s

32. Match the column

Column-I (Compound)		Column-II (Boiling point)	
(a)	Propanal	(p)	370
(b)	Acetone	(q)	322
(c)	1-Propanol	(r)	273
(d)	n-Butane	(s)	329

(1) a = q, b = s, c = p, d = r
(2) a = q, b = p, c = s, d = r
(3) a = p, b = q, c = r, d = s
(4) a = p, b = q, c = s, d = r

33. Given below are two statements:

Statement-I : Aldehydes are easily oxidised to carboxylic acids on treatment with common oxidising agent like HNO_3, $KMnO_4$,$K_2Cr_2O_7$ etc. Even mild oxidising agents mainly Tollen & Fehling reagent also oxidise aldehydes.

Statement-II : Ketones are generally oxidised under vigorous conditions in presence of strong oxidising agents and at elevated temperature. Their oxidation involves C–C bond cleavage to afford a mixture of carboxylic acids having less number of C-atoms than parent ketone.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are incorrect.

(2) Both Statement-I and statement-II are correct.

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct.

34. Given below are two statements:

Statement-I : The higher acids are wax like solids and are practically odourless due to their low volatility.

Statement-II : Carboxylic acids upto nine carbon atoms are higher boiling point liquids than carbonyl compounds and even alcohols of comparable molecular masses.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and II are correct.

(2) Both statement I and II are incorrect.

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct.

35. Given below are two statements:

Statement-I : In Nucleophilic Addition Reaction, Nucleophile attacks the electrophilic carbon atom of the polar carbonyl group from a direction approximately perpendicular to the plane of sp^2 hybridised orbitals of carbonyl carbon.

Statement-II : Hybridisation of carbon changes from sp^2 to sp^3 in this process and a planar alkoxide intermidiate is formed. This intermediate captures a proton from reaction medium to give electrically neutral product.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and II are correct.

(2) Both statement I and II are incorrect.

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct.

36. Given below are two statements:

Statement-I : In Aldol reaction, name aldol is derived from the names of the two functional groups, aldehyde & alcohol, present in the products.

Statement-II : The aldol & ketol do not readily lose water to give aldol condensation product.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and II are correct.

(2) Both statement I and II are incorrect.

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct.

37. Given below are two statements:

Statement-I : The carbon-oxygen double bond is polarised due to less electronegativity of oxygen relative to carbon.

Statement-II : Carbonyl carbon is an electrophilic & carbonyl oxygen is a nucleophilic center.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and II are correct.

(2) Both statement I and II are incorrect.

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct.

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38. Given below are two statements:

Statement-I : The lower members of aldehydes and ketones such as HCHO, CH_3CHO and CH_3COCH_3 are miscible with water in all proportions because they form H-bond with water.

Statement-II : All aldehydes and ketones are fairly soluble in organic solvents like benzene, ether, methanol, chloroform etc.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and II are incorrect.

(2) Statement I is correct but statement II is incorrect

(3) Both statement I and II are correct.

(4) Statement I is incorrect but statement II is correct.

39. Given below are two statements:

Statement-I : Nitriles are reduced to corresponding imine with stanous chloride in the presence of HCl, which on hydrolysis give corresponding aldehyde.

Statement-II : Nitriles are selectively reduced by DIBAL-H to imines followed by hydrolysis to aldehydes.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement I is correct but statement II is incorrect

(2) Both statement I and II are incorrect.

(3) Both statement I and II are correct.

(4) Statement I is incorrect but statement II is correct.

40. Given below are two statements:

Statement-I : Carbonyl compounds have substantial dipole moments and are polar than ethers.

Statement-II : The high polarity of the carbonyl group is explained on the basis of resonance involving a neutral & a dipolar structures.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement I is correct but statement II is incorrect

(2) Both statement I and II are correct.

(3) Both statement I and II are incorrect.

(4) Statement I is incorrect but statement II is correct.

41. Given below are two statements:

Statement-I : When benzene & its derivative is treated with CO + HCl in presence of anhy. $AlCl_3$ or Cu_2Cl_2, it gives benzoic acid.

Statement-II : Reaction of benzene & its derivatives with CO + HCl in presence of anhy.$AlCl_3$ or Cu_2Cl_2 is known as Gattermann-Koch Reaction.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement I is incorrect but statement II is correct.

(2) Statement I is correct but statement II is incorrect.

(3) Both statement I and II are correct.

(4) Both statement I and II are incorrect.

42. Given below are two statements:

Statement-I : Electronically, Aldehydes are less reactive than ketones towards Nucleophilic Addition Reaction.

Statement-II : Two Alkyl groups increase the electrophilicity of the carbonyl more effectively.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement I is incorrect but statement II is correct.

(2) Both statement I and II are incorrect.

(3) Statement I is correct but statement II is incorrect.

(4) Both statement I and II are correct.

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43. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion: Ketones react with ethylene glycol to form cyclic products known as ethylene glycol ketals in presence of dry HCl.

Reason: Dry hydrogen chloride protonates the oxygen of the carbonyl compounds and therefore, increases the electrophilicity of the carbonyl carbon facilitating the nucleophilic attack of glycol.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

(3) (A) is correct but (R) is not correct.

(4) (A) is not correct but (R) is correct.

44. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion: All ketones on reaction with Grignard reagent, followed by hydrolysis yield tertiary alcohols.

Reason: All aldehydes on reaction with Grignard reagent followed by hydrolysis yield secondary alcohols.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

(3) (A) is correct but (R) is not correct.

(4) (A) is not correct but (R) is correct.

45. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion: Mixture of benzaldehyde and acetaldehyde in hot alkaline medium gives cinnamaldehyde.

Reason: Benzaldehyde is strong electrophile than acetaldehyde.

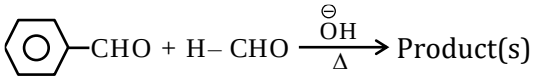
In the light of the above statements, choose the **most appropriate** answer from the options given below :

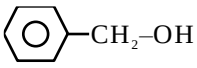
(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

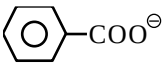
(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

(3) (A) is correct but (R) is not correct.

(4) (A) is not correct but (R) is correct.

46.  will be-

(A) 

(B) 

(C) $HCOO^{\ominus}$

(D) $CH_3–OH$

(1) A, B and C are correct

(2) A & B are correct

(3) C & D are correct

(4) A & C are correct

47. What is incorrect about acetaldehyde :

(A) It is very easily oxidised

(B) It forms 1-hydroxy propane nitrile with HCN

(C) It can be obtained by hydration of acetylene

(D) It gives cannizaro reaction

(1) A, B and C

(2) A & B

(3) B & D

(4) A & C

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48. Which of the following reactions yield carboxylic acids.

(A) $RMgX + CO_2 \xrightarrow{H_2O}$

(B) $Ph{-}OH + NaOH + CO_2 \longrightarrow$

(C) $PhCN + H_3O^{\oplus} \longrightarrow$

(D) $PhOH + CHCl_3 + KOH \longrightarrow$

(1) A, B and C are correct

(2) A & B are correct

(3) B & D are correct

(4) A & C are correct

49. What is true about acetone ?

(A) It restores the pink colour of Schiff's reagent

(B) It is used for the preparation of the hypnotic chloritone

(C) It is very easily oxidised to acetic acid

(D) It forms pinacol on treatment with magnesium amalgum and water.

(1) A, B and C are correct

(2) A & B are correct

(3) B & D are correct

(4) A & C are correct

EXERCISE-III (Analytical Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	3	3	3	2	2	3	3	3	1	4	2	4	2	4	4
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	3	3	4	2	2	4	3	3	1	2	3	4	3	2	2
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	3	1	2	1	3	3	4	3	3	2	1	2	1	3	3
Question	46	47	48	49											
Answer	4	3	1	3											

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Important Notes